

Amendment

(under Article 34 of the Patent Cooperation Treaty)

TO: Examiner of the Japan Patent Office as an International
Preliminary Examining Authority

1. Identification of the International Application
PCT/JP2005/003230

2. Applicant

Name: TOYOTA JIDOSHA KABUSHIKI KAISHA

Address: 1, Toyota-cho, Toyota-shi, Aichi 471-8571 Japan

Country of nationality: JAPAN

Country of residence: JAPAN

3. Agent

Name: ITEC INTERNATIONAL PATENT FIRM

Name of signatory: IGAMI Hiroyuki

Capacity: Representative partner

Address: Uchisaiwaicho Dai Bldg., 3-3, Uchisaiwai-cho 1
chome, Chiyoda-ku, Tokyo 100-0011, Japan

4. Item to be amended: Claims

5. Subject Matter of Amendment: Claims 10, 13, 20 and 21 should
be amended.

Claims:

1. A power output apparatus that outputs power to a driveshaft, said power output apparatus comprising:

5 a first internal combustion engine that outputs power;

a first motor that uses the output power of the first internal combustion engine to generate electric power;

a second internal combustion engine that outputs power to the driveshaft;

10 a second motor that inputs and outputs power from and to the driveshaft;

an accumulator unit that is capable of transmitting electric power to and from the first motor and the second motor; and

15 a first connection disconnection structure that connects and disconnects an output shaft of the first internal combustion engine with and from an output shaft of the second internal combustion engine.

20 2. A power output apparatus in accordance with claim 1, said power output apparatus further comprising:

a second connection disconnection structure that connects and disconnects the output shaft of the second internal combustion engine with and from the driveshaft.

25

3. A power output apparatus in accordance with claim 1,

wherein the first internal combustion engine is drivable with high efficiency at a preset drive point, and

the first motor generates electric power with high efficiency by using the output power of the first internal
5 combustion engine driven at the preset drive point.

4. A power output apparatus in accordance with claim 1, wherein the second internal combustion engine is drivable with high efficiency in a preset rotation speed range, and

10 the second motor outputs a torque close to a maximum possible torque, which is expected as a torque to be output to the driveshaft in a rotation stop state of the driveshaft.

5. A power output apparatus in accordance with claim 4, wherein the preset rotation speed range is from an idling rotation speed or a preset first rotation speed higher than the idling rotation speed to a maximum possible rotation speed expected to the driveshaft.

20 6. A power output apparatus in accordance with claim 1, said power output apparatus further comprising:

a charge state detection unit that detects a state of charge of the accumulator unit;

25 a power demand setting module that sets a power demand to be output to the driveshaft, in response to an operator's operation; and

a control module that controls the first internal combustion engine, the first motor, the second internal combustion engine, the second motor, and the first connection disconnection structure to keep the state of charge of the 5 accumulator unit detected by the charge state detection unit in a predetermined charge range and to ensure output of a power, which is equivalent to the power demand set by said power demand setting module, to the driveshaft.

10 7. A power output apparatus in accordance with claim 1, said power output apparatus further comprising:

a second connection disconnection structure that connects and disconnects the output shaft of the second internal combustion engine with and from the driveshaft;

15 a charge state detection unit that detects a state of charge of the accumulator unit;

a power demand setting module that sets a power demand to be output to the driveshaft, in response to an operator's operation; and

20 a control module that controls the first internal combustion engine, the first motor, the second internal combustion engine, the second motor, and the first connection disconnection structure to keep the state of charge of the accumulator unit detected by the charge state detection unit 25 in a predetermined charge range and to ensure output of a power, which is equivalent to the power demand set by said power demand

setting module, to the driveshaft.

8. A power output apparatus in accordance with claim 7, wherein said control module controls the second connection disconnection structure, when a rotation speed of the driveshaft is lower than a preset reference speed, to disconnect the output shaft of the second internal combustion engine from the driveshaft, while controlling the second connection disconnection structure, when the rotation speed of the driveshaft is not lower than the preset reference speed, to connect the output shaft of the second internal combustion engine with the driveshaft.

9. A power output apparatus in accordance with claim 8, wherein said control module controls the first connection disconnection structure, when the rotation speed of the driveshaft is not lower than the preset reference speed and a torque demand at the set power demand is less than a preset reference torque, to disconnect the output shaft of the first internal combustion engine from the output shaft of the second internal combustion engine, while controlling the first connection disconnection structure, when the rotation speed of the driveshaft is not lower than the preset reference speed and the torque demand at the set power demand is not less than the preset reference torque, to connect the output shaft of the first internal combustion engine with the output shaft of the

second internal combustion engine.

10. (amended) A power output apparatus in accordance with
claim 1, wherein the first internal combustion engine is
5 drivable with high efficiency at a preset drive point, and
the first motor generates electric power with high
efficiency by using the output power of the first internal
combustion engine driven at the preset drive point.

10 11. A power output apparatus in accordance with claim 10,
wherein the second internal combustion engine is drivable with
high efficiency in a preset rotation range, and
the second motor outputs a torque close to a maximum
possible torque, which is expected as a torque to be output to
15 the driveshaft in a rotation stop state of the driveshaft.

12. A power output apparatus in accordance with claim 10,
said power output apparatus further comprising:

a charge state detection unit that detects a state of
20 charge of the accumulator unit;

a power demand setting module that sets a power demand
to be output to the driveshaft, in response to an operator's
operation; and

25 a control module that controls the first internal
combustion engine, the first motor, the second internal
combustion engine, and the second motor to keep the state of

charge of the accumulator unit detected by the charge state detection unit in a predetermined charge range and to ensure output of a power, which is equivalent to the power demand set by said power demand setting module, to the driveshaft.

5

13. (amended) A power output apparatus in accordance with claim 1, wherein the second motor outputs a torque close to a maximum possible torque, which is expected as a torque to be output to the driveshaft in a rotation stop state of the

10 driveshaft.

14. A power output apparatus in accordance with claim 13, wherein the second internal combustion engine is drivable with high efficiency in a specific rotation speed range from an idling rotation speed or a preset first rotation speed higher than the idling rotation speed to a maximum possible rotation speed expected to the driveshaft.

15. A power output apparatus in accordance with claim 13,
20 said power output apparatus further comprising:

a charge state detection unit that detects a state of charge of the accumulator unit;

25 a power demand setting module that sets a power demand to be output to the driveshaft, in response to an operator's operation; and

a control module that controls the first internal

combustion engine, the first motor, the second internal combustion engine, and the second motor to keep the state of charge of the accumulator unit detected by the charge state detection unit in a predetermined charge range and to ensure 5 output of a power, which is equivalent to the power demand set by said power demand setting module, to the driveshaft.

16. A motor vehicle comprising:

a first internal combustion engine that outputs power; 10 a first motor that uses the output power of the first internal combustion engine to generate electric power;

a second internal combustion engine that outputs power to a driveshaft linked with an axle of said motor vehicle; a second motor that inputs and outputs power from and to 15 the driveshaft;

an accumulator unit that is capable of transmitting electric power to and from the first motor and the second motor;

a first connection disconnection structure that connects and disconnects an output shaft of the first internal combustion 20 engine with and from an output shaft of the second internal combustion engine; and

a second connection disconnection structure that connects and disconnects the output shaft of the second internal combustion engine with and from the driveshaft.

25

17. A motor vehicle in accordance with claim 16, said motor

vehicle further comprising:

a charge state detection unit that detects a state of charge of the accumulator unit;

a power demand setting module that sets a power demand 5 to be output to the driveshaft, in response to an operator's operation; and

a control module that controls the first internal combustion engine, the first motor, the second internal combustion engine, the second motor, and the first connection 10 disconnection structure to keep the state of charge of the accumulator unit detected by the charge state detection unit in a predetermined charge range and to ensure output of a power, which is equivalent to the power demand set by said power demand setting module, to the driveshaft.

15

18. A motor vehicle in accordance with claim 17, wherein said control module controls the second connection disconnection structure, when a rotation speed of the driveshaft is lower than a preset reference speed, to disconnect 20 the output shaft of the second internal combustion engine from the driveshaft, while controlling the second connection disconnection structure, when the rotation speed of the driveshaft is not lower than the preset reference speed, to connect the output shaft of the second internal combustion 25 engine with the driveshaft.

19. A motor vehicle in accordance with claim 18, wherein
said control module controls the first connection disconnection
structure, when the rotation speed of the driveshaft is not
lower than the preset reference speed and a torque demand at
5 the set power demand is less than a preset reference torque,
to disconnect the output shaft of the first internal combustion
engine from the output shaft of the second internal combustion
engine, while controlling the first connection disconnection
structure, when the rotation speed of the driveshaft is not
10 lower than the preset reference speed and the torque demand at
the set power demand is not less than the preset reference torque,
to connect the output shaft of the first internal combustion
engine with the output shaft of the second internal combustion
engine.

15

20. (amended) A motor vehicle comprising:
a first internal combustion engine that is driven with
high efficiency at a preset drive point and outputs power;
a first motor that uses the output power of the first
20 internal combustion engine driven at the preset drive point to
generate electric power with high efficiency;
a second internal combustion engine that outputs power
to a driveshaft linked with an axle of said motor vehicle;
a second motor that inputs and outputs power from and to
25 the driveshaft;
an accumulator unit that is capable of transmitting

electric power to and from the first motor and the second motor;

a first connection disconnection structure that connects and disconnects an output shaft of the first internal combustion engine with and from an output shaft of the second internal
5 combustion engine;

a charge state detection unit that detects a state of charge of the accumulator unit;

a power demand setting module that sets a power demand to be output to the driveshaft, in response to an operator's
10 operation; and

a control module that controls the first internal combustion engine, the first motor, the second internal combustion engine, and the second motor to keep the state of charge of the accumulator unit detected by the charge state
15 detection unit in a predetermined charge range and to ensure output of a power, which is equivalent to the power demand set by said power demand setting module, to the driveshaft.

21. (amended) A motor vehicle comprising:

20 a first internal combustion engine that outputs power;

a first motor that uses the output power of the first internal combustion engine to generate electric power;

a second internal combustion engine that outputs power to a driveshaft linked with an axle of said motor vehicle;

25 a second motor that outputs to the driveshaft a torque close to a maximum possible torque, which is expected as a torque

to be output to the driveshaft in a rotation stop state of the driveshaft;

an accumulator unit that is capable of transmitting electric power to and from the first motor and the second motor;

5 a first connection disconnection structure that connects and disconnects an output shaft of the first internal combustion engine with and from an output shaft of the second internal combustion engine;

10 a charge state detection unit that detects a state of charge of the accumulator unit;

a power demand setting module that sets a power demand to be output to the driveshaft, in response to an operator's operation; and

15 a control module that controls the first internal combustion engine, the first motor, the second internal combustion engine, and the second motor to keep the state of charge of the accumulator unit detected by the charge state detection unit in a predetermined charge range and to ensure output of a power, which is equivalent to the power demand set 20 by said power demand setting module, to the driveshaft.